

Viejas Hotel Project TEIR

Appendix D

Acoustical Site Assessment

Prepared by Investigative Science and Engineering, Inc.

December 2, 2011

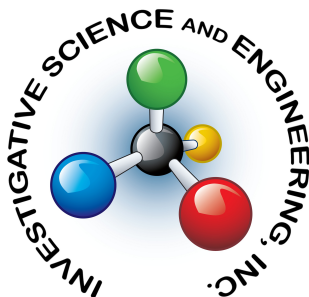
**DRAFT ACOUSTICAL SITE ASSESSMENT
VIEJAS HOTEL PROJECT
SAN DIEGO, CA**

Submitted to:

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ISE Project #11-009

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INTRODUCTION AND DEFINITIONS

Existing Site Characterization

The proposed Viejas Hotel site consists of approximately 2.5 acres, located at 5000 Willows Road, within the Viejas Indian Reservation (a Federal Reservation) in eastern San Diego County (refer to Figure 1 on the following page). The site is directly east of the existing Viejas Casino structure and north of the Viejas Outlet Center (shown as the red hatched area in Figure 2a on Page 3 of this report). Regional access to the site is obtained from Willows Road, via U.S. Interstate 8 (I-8).

The Viejas Hotel site is a fully disturbed land use having a mean elevation of approximately 2,320 feet above mean sea level (MSL) and residing within the footprint area of a temporary bingo pavilion structure. The site is entirely enclosed by reservation property and is surrounded by parking lots, a central plant, and a site maintenance building (refer to Figures 2b and –c on Page 4 of this report).

Project Description

The project under examination is an approximately 156-room (150 guest rooms plus approximately six facilities use spaces), 65-foot tall, five-story hotel, to be built adjacent, and connecting to the existing Viejas Casino. The footprint of the proposed hotel structure is shown in Figure 3, on Page 5 of this report, as a blue hatched-in area. The maximum disturbance area of the project is shown as the red hatched-in area within Figure 3. Approximately 7,200 sq ft of additional seating for the existing buffet restaurant, along with a connection between the hotel and casino, will also be provided as part of this project.

Onsite construction would consist of minimal remedial grading and contouring to facilitate the hotel foundation, as well to realign existing surface roadways around the proposed building. The existing temporary bingo pavilion (a sprung-style tent structure) would be disassembled and removed from the site. Site clearing and grading would occur over an approximate 60-day work period.

Acoustical Definitions and Theory

Sound waves are linear mechanical waves. They can be propagated in solids, liquids, and gases. The material transmitting such a wave oscillates in the direction of propagation of the wave itself. Sound waves originate from some sort of vibrating surface. Whether this surface is the vibrating string of a violin or a person's vocal cords, a vibrating column of air from an organ or clarinet, or a vibrating panel from a loudspeaker, drum, or aircraft, the sound waves generated are all similar. All of these vibrating elements alternatively compress the surrounding air on a forward movement, and expand it on a backward movement.

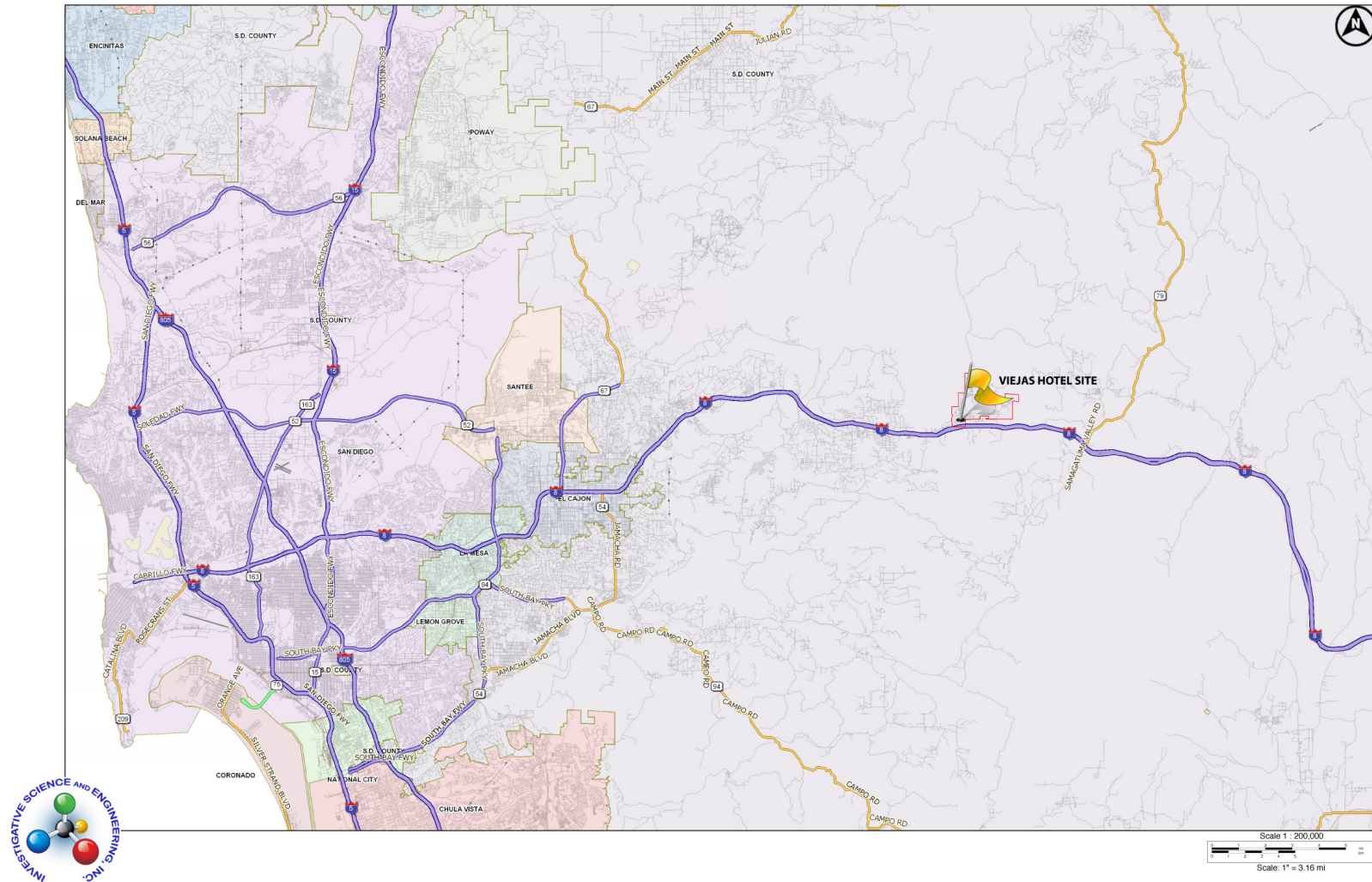


FIGURE 1: Project Study Area Vicinity Map (ISE 12/11)



FIGURE 2a: Aerial Image Showing Proposed Development Area (ISE 12/11)



FIGURE 2b: Project Site Panoramic Photograph – View Looking West (ISE 12/11)



FIGURE 2c: Project Site Panoramic Photograph – View Looking Southwest (ISE 12/11)

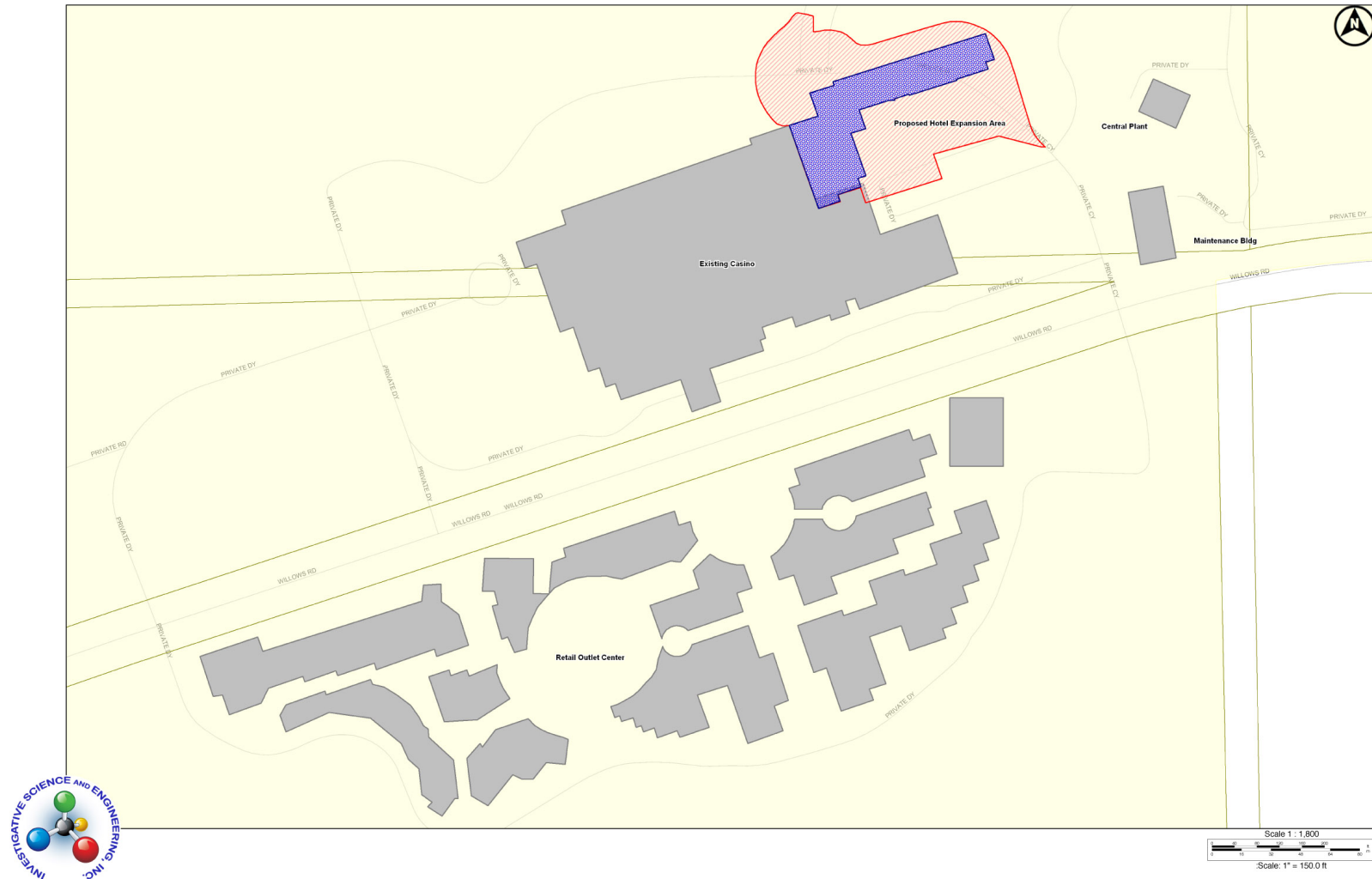


FIGURE 3: Proposed Viejas Hotel Footprint within Development Area (ISE 12/11)

There is a large range of frequencies within which linear waves can be generated, sound waves being confined to the frequency range that can stimulate the auditory organs to the sensation of hearing. For humans, this range is from about 20 Hertz (Hz or cycles per second) to about 20,000 Hz. The air transmits these frequency disturbances outward from the source of the wave.

Sound waves, if unimpeded, will spread out in all directions from a source. Upon entering the auditory organs, these waves produce the sensation of sound. Waveforms that are approximately periodic, or consist of a small number of periodic components, can give rise to a pleasant sensation (assuming the intensity is not too high), for example, as in a musical composition.

Noise, on the other hand, can be represented as a superposition of periodic waves with a large number of components, and is generally defined as unwanted or annoying sound that is typically associated with human activity, and which interferes with or disrupts normal activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise and its appropriateness in the setting, the time of day, and the sensitivity of the individual hearing the sound.

Airborne sound is a rapid fluctuation of air pressure, above and below atmospheric levels. The loudest sounds that the human ear can hear comfortably are approximately one trillion (or 1×10^{12}) times the acoustic energy that the ear can barely detect. Because of this vast range, any attempt to represent the acoustic intensity of a particular sound on a linear scale becomes unwieldy. As a result, a logarithmic ratio, originally conceived for radio work, known as the decibel (dB), is commonly employed.¹

A sound level of zero “0” dB is scaled such that it is defined as the threshold of human hearing, and would be barely audible to a human of normal hearing under extremely quiet listening conditions. Such conditions can only be generated in anechoic or “dead rooms”. Typically, the quietest environmental conditions (extreme rural areas with extensive shielding) yield sound levels of approximately 20 decibels. Normal speech has a sound level of approximately 60 dB. Sound levels above 120 dB roughly correspond to the threshold of pain.

¹ A unit used to express the relative magnitude of a sound wave. This level is defined as being equal to 20 times the common logarithm of the ratio of the pressure produced by a sound wave of interest, to a ‘reference’ pressure wave equal to 20 micro Pascal’s (μPa) measured at a distance of 1 meter. 20 μPa is the smallest amount of pressure capable of producing the sensation of hearing in a human.

The minimum change in sound level that the human ear can detect is approximately 3.0 dBA.² A change in sound level of 10 dB is usually perceived by the average person as a doubling (or halving) of the sound's loudness.³ A change in sound level of 10 dB actually represents an approximate 90 percent change in the sound intensity, but only about a 50 percent change in the perceived loudness. This is due to the nonlinear response of the human ear to sound.

As mentioned above, most of the sounds we hear in the environment do not consist of a single frequency, but rather a broad band of frequencies differing in sound level. The intensities of each frequency add to generate the sound we hear. The method commonly used to quantify environmental sounds, consists of determining all of the frequencies of a sound according to a weighting system that reflects the nonlinear response characteristics of the human ear. This is called "A" weighting, and the decibel level measured is called the A-weighted sound level (or dBA). In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve.⁴

Although the A-weighted sound level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a conglomeration of sounds from distant sources that create a relatively steady background noise in which no particular source is identifiable. For this type of noise, a single descriptor called the L_{eq} (or equivalent sound level) is used. L_{eq} is the energy-mean A-weighted sound level during a measured time interval, and would be defined mathematically by the following continuous integral,

$$L_{eq} = 10 \log_{10} \left[\frac{1}{T} \int_0^T SPL(t)^2 dt \right]$$

where,

L_{eq} is the energy equivalent sound level,
 t is the independent variable of time,
 T is the total time interval of the event,

² Every 3 dB equates to a 50% of drop (or increase) in wave strength; therefore a 6 dB drop/increase = a loss/increase of 75% of total signal strength and so on.

³ This is a subjective reference based upon the nonlinear nature of the human ear.

⁴ In some cases, it is important to measure the distribution of sound pressure as a function of frequency. Under these circumstances, the incoming sound wave is passed through a series of band pass filters having predefined frequencies where they are resonant. The relative response of each filter (in dB, dBA, etc.) directly corresponds to the amount of sound energy present at that particular frequency. In standard acoustics two unique filter sets are used to accomplish this task, namely the 1/1 octave band and 1/3 octave band set. An octave is defined as the interval between any two frequencies having a ratio of 2 to 1.

By definition, a whole octave filter (1/1) is a band-pass filter having a bandwidth equal to 70.7-percent of its center frequency (i.e., the frequency of interest) distributed across 11 bands between 11 Hz and 22,700 Hz (the effective audio frequency range). A 1/3 Octave Band filter has a bandwidth equal to 23.1% of its center frequency, distributed across 32 bands between 14.1 Hz and 22,390 Hz. Thus, the octave band frequencies would be 16, 31.5, 63, 125, 250, 500, 1000, 2000, 4000, 8000 and 16000 Hz. The corresponding 1/3 octave band frequencies would be 16, 20, 25, 31.5, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, 10000, 12500, 16000 and 20000 Hz.

and, SPL is the sound pressure level re. 20 μ Pa.

Thus, L_{eq} is the ‘equivalent’ constant sound level that would have to be produced by a given source to equal the average of the fluctuating level measured. For most acoustical studies, the study interval is generally taken as one-hour and is abbreviated L_{eq-h} or $L_{eq(h)}$; however, other time intervals are utilized depending on the jurisdictional preference.

For a series of discrete sound sources, the above expression would reduce to its Riemann equivalent to,

$$L_{eq} = 10 \log_{10} \left[\frac{1}{T} \sum_{i=1}^n SPL(t_i)^2 \Delta t_i \right]$$

To describe the time-varying character of environmental noise, the statistical noise descriptors L_{10} , L_{50} , and L_{90} are commonly used. They are the noise levels equaled or exceeded during 10 percent, 50 percent, and 90 percent of a stated time.

Sound levels associated with the L_{10} typically describe transient or short-term events, while levels associated with the L_{90} describe the steady state (or most prevalent) noise conditions. The L_{50} level is the arithmetic average of the measured sound interval. In addition, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the maximum and minimum measured sound level (L_{max} and L_{min}) indicators. The L_{min} value obtained for a particular monitoring location is often called the *acoustic floor* for that location.

Finally, the aggregate of all community noise events are typically averaged into a single value known as the Day-Night Sound Level (DNL or Ldn). The Ldn is defined as the “A” weighted average sound level for a 24-hour day. It is calculated by adding a 10-decibel penalty to sound levels that occur during nighttime hours (i.e., 10:00 p.m. to 7:00 a.m.). This penalty is applied to compensate for the increased sensitivity to noise during the quieter nighttime hours.

Mathematically, Ldn can be derived based upon the hourly L_{eq} values, via the following expression:

$$Ldn = 10 \log_{10} \frac{1}{n} \sum_{i=1}^n \left(10^{\frac{Leq(day)_i}{10}} + 10^{\frac{Leq(night+10)_i}{10}} \right)$$

where,

$L_{eq}(x)_i$ is the equivalent sound level during period ‘x’ at time interval ‘i’
and ‘n’ is the number of time intervals.



ENVIRONMENTAL SIGNIFICANCE THRESHOLDS

The proposed Viejas Hotel project would, as a project located on a federal reservation, be subject to the guidelines of the Noise Control Act of 1972.⁵ These standards define land use compatibility in terms of future and/or predicted noise exposure levels.⁶ The site acceptability standards are shown below in Table 1.

TABLE 1: U.S. EPA Outdoor Noise Level Criteria Recommendations

Land Use	Noise Metric	Activity Interference	Hearing Loss	Protect Against Both
Residential W/ Outside Space	Ldn Leq(24)	55	70	55 ^(b)
Residential W/ No Outside Space	Ldn Leq(24)			
Commercial Areas	Leq(24)	(a)	70	70 ^(c)
Interior Transport	Leq(24)			
Industrial Areas	Leq(24) ^(d)	(a)	70	70 ^(c)
Hospitals	Ldn Leq(24)	55	70	55 ^(b)
Educational Facilities	Ldn Leq(24) ^(d)	55	70	55 ^(b)
Recreational	Leq(24)	(a)	70	70 ^(c)
Farm Land / Unpopulated Uses	Leq(24)	(a)	70	70 ^(c)

Comments:

- (a) Since different types of activities appear to be associated with different levels, identification of a maximum level for activity interference may be difficult except in those circumstances where speech communication is a critical activity.
- (b) Based on lowest level.
- (c) Based only on hearing lost.
- (d) An Leq(8) of 75 dB may be identified in these situations so long as the exposure over the remaining 16 hours per day is low enough to result in a negligible contribution to the 24-hour average, i.e., no greater than an Leq of 60 dBA.

Note: The exposure period, which results in hearing loss at the identified level, is a period of 40 years.

⁵ Per 42 U.S.C. 4901 to 4918.

⁶ Source: *Information levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, U.S. Environmental Protection Agency, March 1974.

The EPA has not promulgated regulations for environmental noise; however, the EPA has identified yearly day-night average sound levels, Ldn, sufficient to protect public health and welfare from the effects of environmental noise. The EPA has established a goal to reduce exterior environmental noise to an Ldn not exceeding 55 dBA. In the case where the existing ambient noise level is already in excess of this level, the existing ambient becomes the applicable standards.

Additionally, the EPA has established that one's 24-hour equivalent sound level exposure at the ear or Leq(24), should not exceed 70 dBA in order to protect against hearing damage. The EPA emphasizes that these goals are not regulations as they have no authority to regulate noise levels, but rather these goals are intended as noise levels below which the general population will not be at risk.

For the purposes of impact assessment within this report, the applicable standard would be 55 dBA Ldn as measured at any nearby sensitive residential receptors. This standard would be applicable to both operational and construction noise emissions from the proposed hotel site.



ANALYTICAL APPROACH AND METHODOLOGY

Existing Conditions Survey

A single monitoring location was selected at the entrance to the project site for the purpose of determining the ambient baseline traffic and community noise conditions. The instrumentation location, denoted as Monitoring Location ML 1 is shown in Figure 4a on the following page. Measurements were performed on November 30, 2011, between 9:30 a.m. and 10:30 a.m., with normal traffic flow conditions in the vicinity of the project site.

For the field monitoring effort, a Quest SoundPro SP-DL-2 ANSI Type 2 integrating sound level meter was used as the data collection device. The meter was affixed to a tripod five-feet above ground level, in order to simulate the noise exposure of an average-height human being. Prior to testing, all equipment was calibrated at ISE's acoustics and vibration laboratory to verify conformance with ANSI S1-4 1983 Type 2 and IEC 651 Type 2 standards.⁷ Photos of the test setup are shown in Figure 4b on Page 12 of this report.

⁷ All testing and calibration is performed by ISE's Acoustics and Vibration Laboratory using a LORAN-C and Rubidium atomic frequency and time standard traceable to National Institute of Standards & Technology (NIST). The time and frequency calibration signal has a long-term stability of 10^{-10} . Specifications for traceability can be obtained at www.nist.gov.

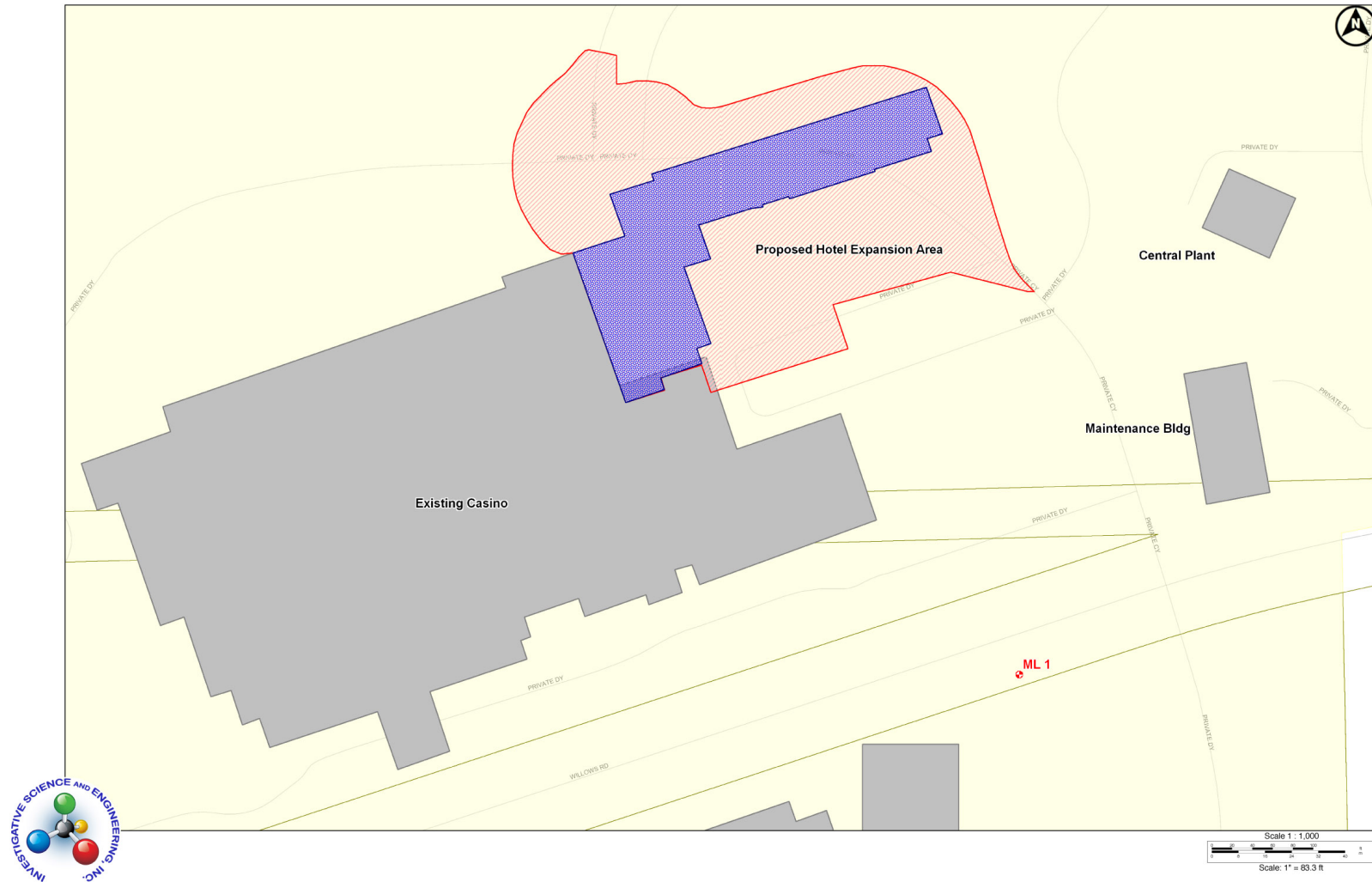


FIGURE 4a: Ambient Noise Monitoring Location ML 1 (ISE 12/11)



FIGURE 4b: Ambient Monitoring Location Photos (ISE 12/11)

Construction Noise Impact Assessment Approach

Major construction noise emission generators would consist primarily of activities associated with site clearing and demolition, underground utility work, and remedial grading and surface paving activities. Construction noise present at the project site was based upon past measured levels and sources from EPA PB 206717 of each expected equipment type, the duty cycle of each of the equipment components, and the expected average noise level (over a given 12-hour workday), as well as the expected worst-case noise level at the nearest sensitive receptor.

Cumulative (i.e., worst case aggregate) levels were calculated for a range of expected worst-case noise emissions from proposed equipment at the closest sensitive receptor, and compared against the aforementioned U.S. EPA recommended noise threshold.

Traffic Segment Impact Assessment Approach

The ISE *RoadNoise v2.4* traffic noise prediction model, which is based upon the Federal Highway Administration's RD-77-108 Noise Prediction Model with FHWA/CA/TL-87/03 noise emission factors, was used to calculate the increase in vehicular traffic noise levels, due to the proposed Viejas Hotel project site, along all identified major servicing roadways.⁸ The model assumed a 'hard-site' propagation rule and a 95/3/2 mix of automobiles/midsize vehicles/trucks, thereby yielding a representative worst-case noise contour set.⁹

Stationary Onsite Noise Assessment Approach

Finally, proposed stationary onsite noise sources, consisting of ten 20-ton rooftop-mounted HVAC units (as shown in Figure 5 on the following page), were modeled in a three-dimensional fashion using the ISE Industrial Source Model (IS³) v4.0.¹⁰ The IS³ model calculates the predicted acoustic field pattern using a vector-based summation of all source-receptor pairs. The resulting output consists of an isogram containing the predicted acoustic field.

The proposed HVAC units were modeled as simultaneously operating spherical radiators under worst-case propagation conditions. Significant attenuative features of the structure consisted only of the proposed five-foot-high rooftop parapet.

⁸ Source: *Draft Traffic Impact Analysis – Viejas Hotel*, LLG Engineers, Inc., 10/26/11.

⁹ *Hard Site* propagation is defined as a 3.0-dBA loss per doubling of distance (DD) between source and receiver.

¹⁰ The ISE *Industrial Source Model (IS³) v4.0* provides a visual representation of an acoustic field pattern across any three-dimensional surface, factoring in the effects of topographic and structural interference, apparent receptor elevation, static reflection from objects, multiple material attenuative sources, variable propagation rates and source types, and atmospheric scattering.

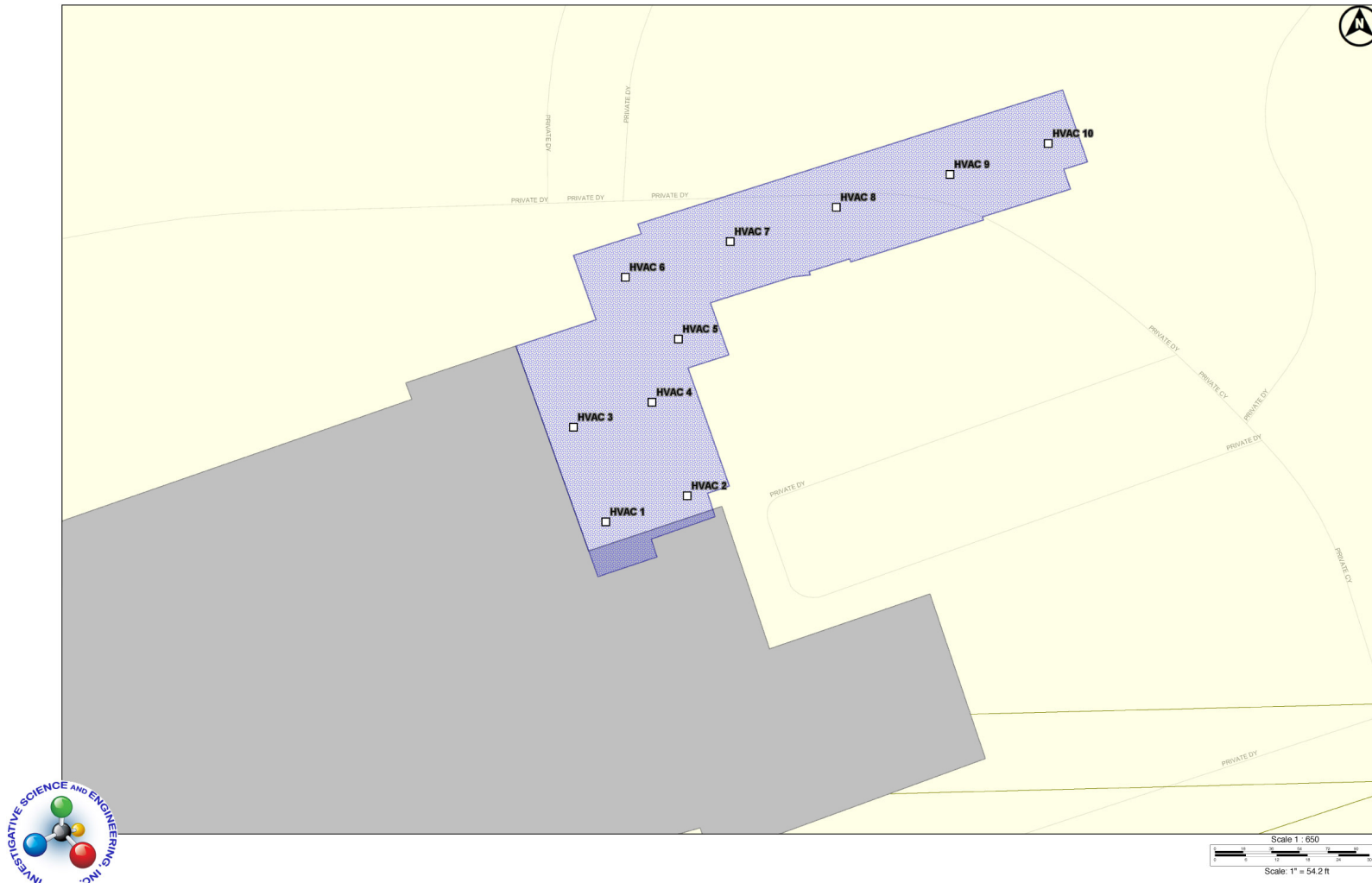


FIGURE 5: Modeled Rooftop HVAC Locations (ISE 12/11)



FINDINGS AND RECOMMENDATIONS

Ambient Sound Measurement Results

The results of the ambient sound level monitoring are shown in Table 2 below with the field data record provided as an attachment to this report. The values for the equivalent sound level (L_{eq-h}), the maximum and minimum measured sound levels (L_{max} and L_{min}), and the statistical indicators L_{10} , L_{50} , and L_{90} , are given for the monitoring location examined.

TABLE 2: Measured Ambient Sound Levels – Viejas Hotel Site

Monitoring Location	Start Time	1-Hour Noise Level Descriptors in dBA					
		L_{eq}	L_{max}	L_{min}	L_{10}	L_{50}	L_{90}
ML 1	9:30 a.m.	57.2	74.9	47.0	60.6	51.5	48.5

Monitoring Location:

Location 1: Along Willows Road at the Viejas Casino Main Entrance.
GPS: CA-VI 6422348.0, 1886331.7, EPE 8 ft, Temp 66.1 °F, RH 33.4%

Measurements performed by ISE on 11/30/11. EPE = Estimated Position Error.

Measurements collected reflect the ambient daytime community sound levels in the vicinity of the proposed project site. As can be seen, the hourly average sound level (or L_{eq-h}) recorded over the monitoring period was found to be 57.2 dBA and was observed to be entirely due to intermittent traffic activity. These levels were found to be consistent with the EPA's compatibility standards.

Construction Noise Emission Levels

The estimated construction equipment noise emissions are provided in Table 3, on the following page, for the anticipated major construction grading operations expected at the project site. Construction within the proposed project area would typically occur between the hours of 7:00 a.m. and 3:00 p.m. Monday through Friday. The nearest sensitive residential receptor area would be, at a minimum, approximately 1,230-feet from any construction activity centroid.

As can be seen, predicted worst-case construction noise levels could be as high as 75.5 dBA Leq_{12h} at 50-feet, with a resultant receptor level of 47.7 dBA Leq_{12h} . This level is below U.S. EPA noise abatement threshold and is not expected to generate impacts, nor require mitigation.

TABLE 3: Predicted Construction Noise Levels – Viejas Hotel Project Site

Construction Phase	Equipment Type	Qty. Used	Duty Cycle (Hrs. / day)	Source Level @ 50 Feet (dBA)	Cumulative Effect @ 50 Feet (dBA Leq _{12h})
Remedial Grading / Clearing / Hauling					
	Dozer - D8 Cat	1	8	75	73.2
	Loader	1	8	70	68.2
	Water Truck	1	4	65	60.2
	Dump/Haul Trucks	2	4	70	68.2
Worst-Case Aggregate Sum @ 50 Ft. (Σ):					75.5
Sum @ Closest Receptor Area 1,230-Feet Distant (Σ):					47.7
Underground Utility Construction					
	Track Backhoe	1	6	70	67.0
	Loader	1	6	70	67.0
	Concrete Truck	2	0.5	70	59.2
	Dump/Haul Trucks	2	4	70	68.2
Worst-Case Aggregate Sum @ 50 Ft. (Σ):					72.4
Sum @ Closest Receptor Area 1,230-Feet Distant (Σ):					44.6
Surface Paving Operations					
	Skid Steer Cat	1	6	70	67.0
	Dump/Haul Trucks	4	0.5	70	62.2
	Paver	1	8	65	63.2
	Roller	1	8	65	63.2
Worst-Case Aggregate Sum @ 50 Ft. (Σ):					70.4
Sum @ Closest Receptor Area 1,230-Feet Distant (Σ):					42.5
Source: EPA PB 206717, Environmental Protection Agency, 12/31/71, "Noise from Construction Equipment and Operations"					

Future Traffic Noise Impacts

The results showing the effect of traffic noise increases on the various servicing roadway segments associated with the proposed Viejas Hotel projects site are presented in Table 4 on the following page. The scenarios examined consisted of near term weekday and weekend project traffic noise along Willows Road, both east and west of the Viejas Casino main entrance.

For each roadway segment examined, the worst case average daily traffic volume (ADT) and observed/predicted speeds are shown, along with the corresponding reference noise level at 50-feet (in dBA). Additionally, the line-of-sight distance from the roadway centerline to the 60 through 75 dBA Ldn contours are provided as an indication of the worst-case unobstructed theoretical traffic noise contour placement.

As can be seen, future cumulative traffic noise levels are expected to increase on Willows Road by a worst case 1.8 dBA Ldn west of the main casino entrance, and by 0.5 dBA Ldn east of the entrance. This would not be deemed a significant impact. Further, the projected noise exposure contours would not expose existing sensitive receptor areas to adverse noise levels as defined by the EPA.

Stationary Onsite Noise Emission Levels

Finally, the results of the rooftop HVAC analysis are shown in Figure 6 on Page 19 of this report. The IS³ input model deck is provided an attachment to this report. Each HVAC unit was modeled as a spherical radiator having a mean emissive spectra of 500-Hz and a source sound pressure level of 75 dBA at 50-feet. All units were modeled under worst-case propagation conditions assuming continuous and simultaneous operation.

As can be seen from the contour plot, all sound emissions above 55 dBA remain effectively confined within the five-foot-high rooftop parapet. The 50 dBA L_{eq-h} contour remains within the confines of the reservation boundaries. The 45 dBA contour is observed to extend into nearby off-reservation parcels, but would not constitute an impact as defined by U.S. EPA standards. Given this, no impacts are anticipated and no mitigation is identified.

TABLE 4: Near Term Weekday and Weekend Project Traffic Noise Conditions

					Ldn Contour Distances (feet)			
Roadway	Segment	ADT	Speed (MPH)	SPL	75 Ldn	70 Ldn	65 Ldn	60 Ldn
<u>Near Term Cumulative Conditions (Weekday)</u>								
Willow Road	West of Viejas Casino Entrance	8,190	45	68.5	11	35	112	354
	East of Viejas Casino Entrance	2,530	45	63.4	3	11	35	109
<u>Near Term Cumulative Conditions (Weekend)</u>								
Willow Road	West of Viejas Casino Entrance	12,270	45	70.3	17	54	169	536
	East of Viejas Casino Entrance	2,820	45	63.9	4	12	39	123
<u>Notes:</u>								
o ADT = Average Daily Trips – Source: LLG Engineers, Inc., 10/26/11.								
o SPL = Sound Pressure Level in dBA at 50-feet from the road edge. Ldn = Community Day-Night Level.								
o All values given in dBA Ldn. Contours assumed to be line-of-sight perpendicular (⊥) distance.								

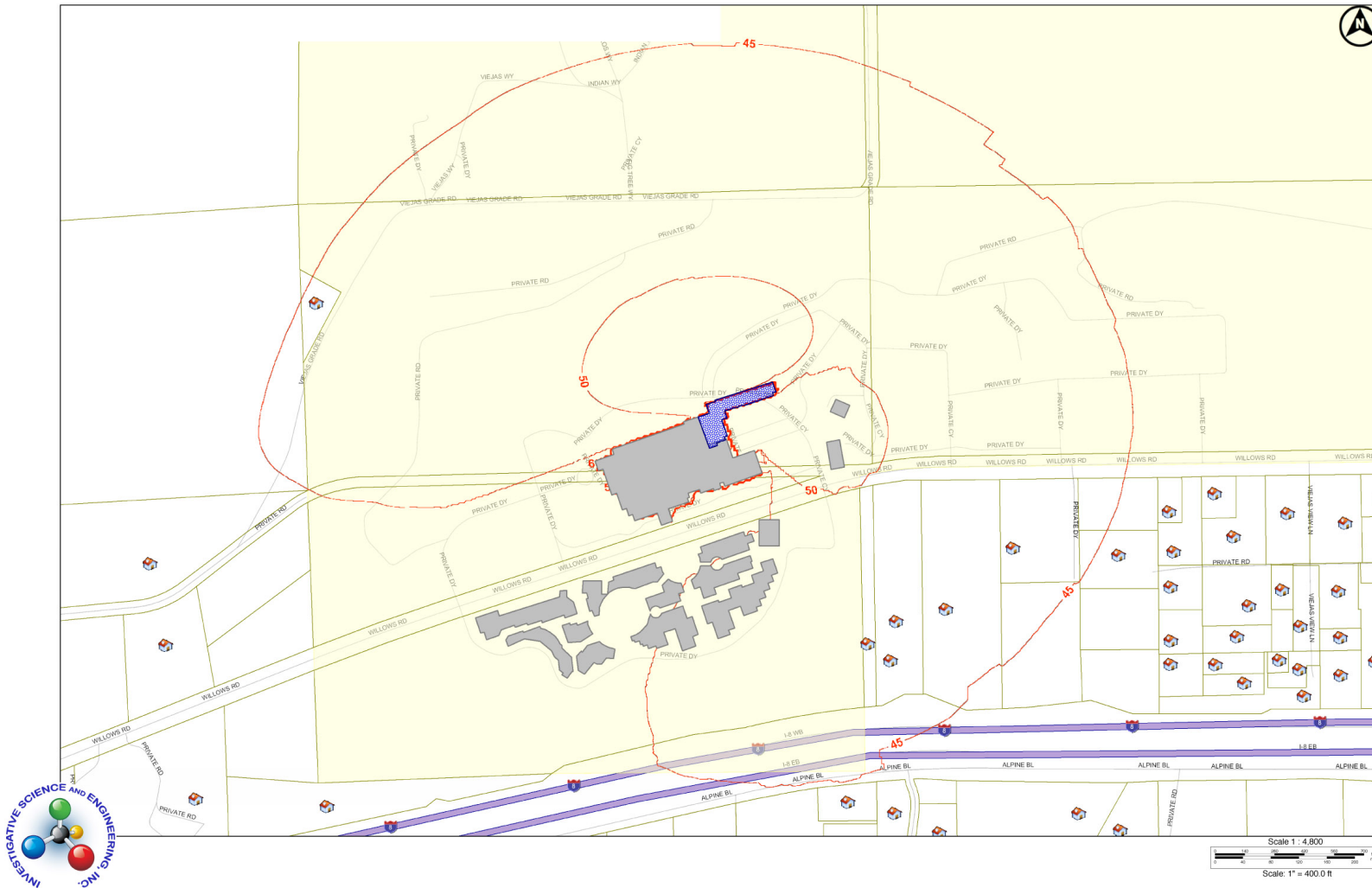


FIGURE 6: Rooftop HVAC Noise Exposure Contours (ISE 12/11)



CERTIFICATION OF ACCURACY AND QUALIFICATIONS

This report was prepared by Investigative Science and Engineering, Inc. (ISE), located at 1134 D Street, Ramona, CA 92065. The members of its professional staff contributing to the report are listed below:

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ISE affirms to the best of its knowledge and belief that the statements and information contained herein are in all respects true and correct as of the date of this report. Should the reader have any questions regarding the findings and conclusions presented in this report, please do not hesitate to contact ISE at (760) 787-0016.

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Approved as to Form and Content:

Rick Tavares, Ph.D.

Project Principal
Investigative Science and Engineering, Inc. (ISE)



APPENDICES / SUPPLEMENTAL INFORMATION

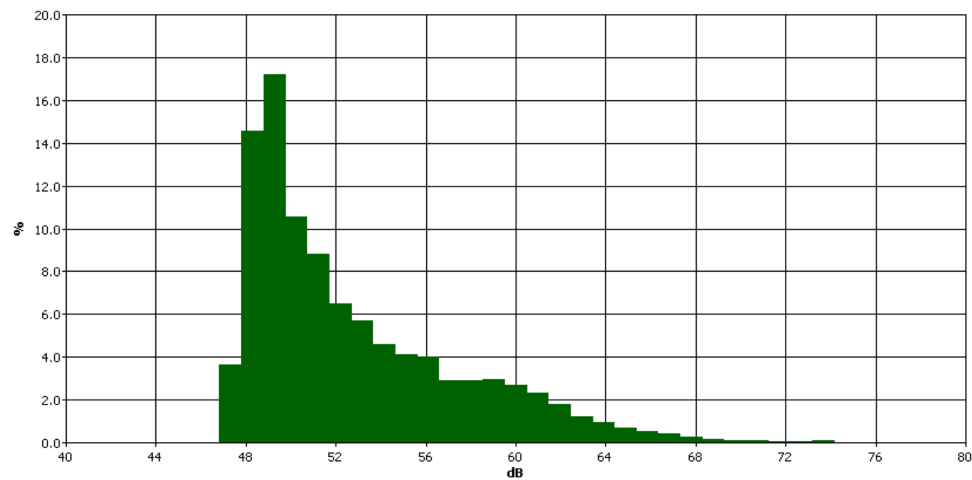
Quest SP DL/2 Post-Processed Output Data (Monitoring Station ML 1)

Viejas Hotel - ML 1

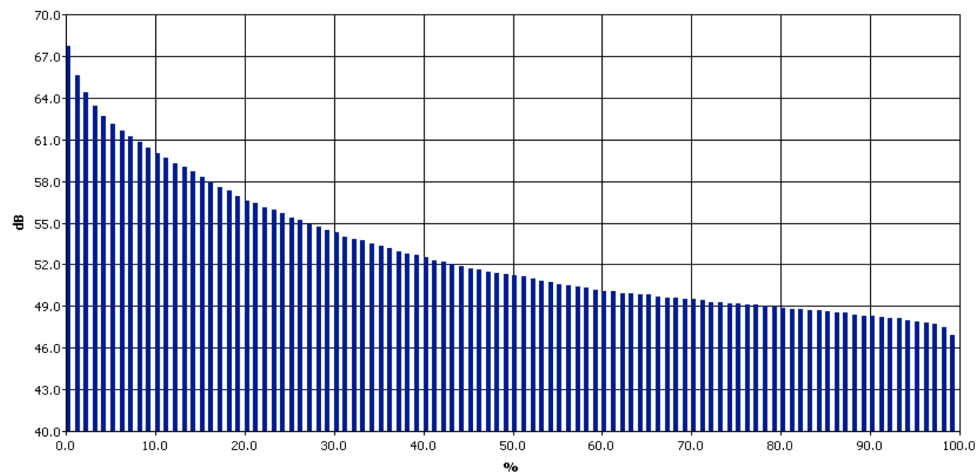
Information Panel

Name	S004
Start Time	Wednesday, November 30, 2011 09:36:15
Stop Time	Wednesday, November 30, 2011 10:36:25
Device Model Type	SoundPro DL
Comments	

Statistics Chart



Exceedance Chart



Statistics Table

dB	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Statistics Table (cont'd)

dB	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
43.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
46.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
47.0	0.1	0.0	0.1	0.1	0.3	0.3	0.4	0.6	0.9	0.7	3.7
48.0	1.0	1.1	1.3	1.6	1.4	1.4	1.6	1.6	1.8	1.7	14.6
49.0	1.6	1.9	1.7	2.0	1.9	1.7	1.6	1.6	1.6	1.7	17.2
50.0	1.7	0.9	1.1	1.1	1.1	1.0	1.0	0.9	0.9	0.8	10.6
51.0	0.9	0.9	0.9	0.8	1.0	0.9	0.9	0.9	0.8	0.8	8.8
52.0	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.7	0.7	8.5
53.0	0.8	0.3	0.6	0.6	0.5	0.7	0.6	0.6	0.6	0.5	5.7
54.0	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.4	0.4	0.4	4.6
55.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	4.1
56.0	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	4.0
57.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	2.9
58.0	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	2.9
59.0	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	3.0
60.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	2.7
61.0	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	2.3
62.0	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	1.8
63.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.2
64.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.9
65.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.7
66.0	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.5
67.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
68.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
69.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
70.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
71.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
72.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
73.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
74.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
76.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
78.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
79.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Exceedance Table

	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%
0%		67.7	65.6	64.4	63.4	62.7	62.1	61.6	61.2	60.8
10%	60.4	60.0	59.7	59.3	59.0	58.7	58.3	58.0	57.6	57.3
20%	56.9	56.6	56.4	56.1	55.9	55.7	55.4	55.2	54.9	54.7
30%	54.5	54.3	54.0	53.8	53.7	53.5	53.3	53.2	52.9	52.8
40%	52.7	52.5	52.3	52.2	52.0	51.9	51.7	51.6	51.5	51.4
50%	51.3	51.2	51.1	51.0	50.8	50.7	50.6	50.5	50.4	50.3
60%	50.2	50.1	50.1	49.9	49.9	49.8	49.8	49.7	49.6	49.6
70%	49.5	49.5	49.4	49.3	49.3	49.2	49.2	49.1	49.1	49.0
80%	49.0	48.9	48.8	48.8	48.7	48.7	48.6	48.5	48.5	48.4
90%	48.3	48.3	48.2	48.1	48.1	48.0	47.9	47.8	47.7	47.5
100%	46.9									

Logged Data Table

Timestamp	Leq-1	Lmax-1	Lmin-1
11/30/2011 9:37:15 AM	65.4	74.9	49.6
11/30/2011 9:38:15 AM	54.5	61.5	49.9
11/30/2011 9:39:15 AM	53.6	57.1	49.4
11/30/2011 9:40:15 AM	49.6	52.8	47.7
11/30/2011 9:41:15 AM	52.6	62.0	47.3
11/30/2011 9:42:15 AM	58.7	66.4	48.4
11/30/2011 9:43:15 AM	56.4	63.9	48.2
11/30/2011 9:44:15 AM	52.0	58.4	48.1
11/30/2011 9:45:15 AM	53.8	62.6	47.4
11/30/2011 9:46:15 AM	64.4	74.4	48.5
11/30/2011 9:47:15 AM	55.3	61.6	48.1
11/30/2011 9:48:15 AM	55.0	63.1	48.2
11/30/2011 9:49:15 AM	52.1	59.4	48.1
11/30/2011 9:50:15 AM	56.2	65.1	48.2
11/30/2011 9:51:15 AM	52.5	61.1	47.3
11/30/2011 9:52:15 AM	58.7	69.6	48.9
11/30/2011 9:53:15 AM	61.5	71.6	48.6
11/30/2011 9:54:15 AM	54.2	61.9	48.4
11/30/2011 9:55:15 AM	58.9	66.6	47.9
11/30/2011 9:56:15 AM	58.4	69.9	47.8
11/30/2011 9:57:15 AM	49.5	51.9	48.1
11/30/2011 9:58:15 AM	58.4	66.0	48.7
11/30/2011 9:59:15 AM	57.7	66.6	48.6
11/30/2011 10:00:15 AM	56.3	62.9	48.6
11/30/2011 10:01:15 AM	54.1	63.9	47.1
11/30/2011 10:02:15 AM	53.1	58.9	47.7
11/30/2011 10:03:15 AM	56.3	64.8	48.6
11/30/2011 10:04:15 AM	55.8	67.0	47.9
11/30/2011 10:05:15 AM	51.7	61.3	47.5
11/30/2011 10:06:15 AM	57.0	65.7	48.7
11/30/2011 10:07:15 AM	53.6	64.0	48.4
11/30/2011 10:08:15 AM	54.4	62.8	47.0
11/30/2011 10:09:15 AM	48.2	49.1	47.5

Logged Data Table (cont'd)

Timestamp	Leq-1	Lmax-1	Lmin-1
11/30/2011 10:10:15 AM	53.0	61.0	47.7
11/30/2011 10:11:15 AM	54.7	62.6	47.7
11/30/2011 10:12:15 AM	59.3	69.1	48.7
11/30/2011 10:13:15 AM	49.5	52.4	48.1
11/30/2011 10:14:15 AM	54.8	61.7	48.2
11/30/2011 10:15:15 AM	56.3	65.4	48.5
11/30/2011 10:16:15 AM	56.4	63.5	48.3
11/30/2011 10:17:15 AM	58.2	64.0	52.7
11/30/2011 10:18:15 AM	58.7	68.4	50.6
11/30/2011 10:19:15 AM	60.6	68.3	50.3
11/30/2011 10:20:15 AM	59.8	69.3	51.3
11/30/2011 10:21:15 AM	52.9	60.0	49.3
11/30/2011 10:22:15 AM	54.5	64.8	49.0
11/30/2011 10:23:15 AM	52.7	60.3	48.9
11/30/2011 10:24:15 AM	54.3	62.1	48.5
11/30/2011 10:25:15 AM	54.7	64.5	48.4
11/30/2011 10:26:15 AM	57.9	69.2	48.0
11/30/2011 10:27:15 AM	57.8	68.6	49.8
11/30/2011 10:28:15 AM	54.1	61.9	47.6
11/30/2011 10:29:15 AM	58.1	65.9	50.5
11/30/2011 10:30:15 AM	56.0	65.0	48.7
11/30/2011 10:31:15 AM	54.9	64.4	48.2
11/30/2011 10:32:15 AM	57.9	68.3	48.8
11/30/2011 10:33:15 AM	56.4	68.7	48.6
11/30/2011 10:34:15 AM	59.7	67.8	49.0
11/30/2011 10:35:15 AM	57.5	67.1	48.8
11/30/2011 10:36:15 AM	55.1	63.3	48.6

IS³ Input Model (Viejas Hotel HVAC Rooftop Configuration)

IS3 PROGRAM INPUT DECK - (C) 2011 INVESTIGATIVE SCIENCE & ENGINEERING INC.

GLOBAL VARIABLE DECLARATION

PROBLEM STATEMENT: VIEJAS HOTEL HVAC NOISE GENERATION (FLAT TERRAIN)
STARTING POINT (XY IN FEET): 6417178.4,1881541.4
ENDING POINT (XY IN FEET): 6427454.0,1890353.2
ANALYSIS FREQUENCY (HZ): 500
REFERENCE DISTANCE FOR SOUND (D IN FEET): 50
SOUND PROPAGATION COEFF XLOG10: 20
EXCESS ATTENUATION (DB): 0
COMPUTATIONAL STEP DISTANCE (IN FEET): 10
RECEPTOR ELEVATION (IN FEET): 5

ACOUSTIC SOURCE DECLARATION (XYZ - SOUND LEVEL - LABEL)

NUMBER OF SOURCE POINTS: 10
6422017.66,1886651.81,60,75,HVAC UNIT 1
6421965.63,1886635.51,60,75,HVAC UNIT 2
6421995.55,1886711.37,60,75,HVAC UNIT 3
6421945.32,1886695.8,60,75,HVAC UNIT 4
6422012.46,1886751.46,60,75,HVAC UNIT 5
6421978.76,1886790.87,60,75,HVAC UNIT 6
6422045.75,1886813.21,60,75,HVAC UNIT 7
6422113.66,1886834.69,60,75,HVAC UNIT 8
6422186.24,1886855.28,60,75,HVAC UNIT 9
6422248.94,1886874.66,60,75,HVAC UNIT 10

BARRIER SEGMENT DECLARATION (START XY - END XY - HEIGHT - STC - LABEL)

NUMBER OF BARRIER PAIRS: 44
6421735.18,1886240.73,6421713.86,1886297.42,65,0,STRUCTURAL DEFINITION 1
6421713.86,1886297.42,6421608.78,1886265.66,65,0,STRUCTURAL DEFINITION 2
6421608.78,1886265.66,6421599.12,1886292.07,65,0,STRUCTURAL DEFINITION 3
6421599.12,1886292.07,6421580.46,1886286.3,65,0,STRUCTURAL DEFINITION 4
6421580.46,1886286.3,6421569.79,1886317.57,65,0,STRUCTURAL DEFINITION 5
6421569.79,1886317.57,6421551.13,1886312.75,65,0,STRUCTURAL DEFINITION 6
6421551.13,1886312.75,6421523.06,1886389.0,65,0,STRUCTURAL DEFINITION 7
6421523.06,1886389.0,6421501.43,1886383.24,65,0,STRUCTURAL DEFINITION 8
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6421439.21,1886498.67,6421424.68,1886541.67,65,0,STRUCTURAL DEFINITION 11
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6421839.27,1886726.28,6421957.12,1886765.76,65,0,STRUCTURAL DEFINITION 16
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6421767.88,1886316.71,6421784.29,1886260.99,65,0,STRUCTURAL DEFINITION 43
6421784.29,1886260.99,6421735.18,1886240.73,65,0,STRUCTURAL DEFINITION 44

DISCRETE RECEPTOR POINT DECLARATION (XYZ - LABEL)

NUMBER OF DISCRETE RECEPTORS: 0
0,0,0,NOPOINT

END OF INPUT FILE - REV 4.0



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